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JC07 Rec'd PCT/PTO 16 APR 2001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Attorney's Docket No. 982919 US  
Date: April 16, 2001

Commissioner of Patents and Trademarks  
Box: PCT  
Washington, DC 20231

TRANSMITTAL OF INTERNATIONAL PATENT APPLICATION  
FOR NATIONAL FILING UNDER 35 U.S.C. § 371  
(Page 1 of 2)

Dear Sir:

Transmitted herewith for national filing in the US PTO under 35 U.S.C. § 371 of PCT International Patent Application No. PCT/EP99/07278, filed on October 1, 1999, claiming priority from German Patent Application No. 198 47 831.3, filed on October 16, 1998:

Inventor(s): Leopold MADER and Rudolf MIKL

For: SAFETY RELAY

Enclosed are papers, identified as follows:

The PCT International Publication (application as filed) and the International Preliminary Examination Report with any annexes attached thereto were forwarded to the US PTO by the International Bureau of WIPO (see enclosed copy of Form IB/308 and IPEA/416 as proof)

\_\_\_\_ Declaration or Oath and Petition, Power of Attorney  
      X   To follow if this line is checked

  X   Preliminary Amendment

  X   Information Disclosure Statement  
    (reference(s) not cited in PCT International Search Report are enclosed, if any)

One Assignment is:

\_\_\_\_ enclosed, signed by inventor(s) to employer with a separate cover sheet; or  
      X   to follow.

Attorney's Docket No. 982919 US  
Inventor: Mader et al.

TRANSMITTAL OF INTERNATIONAL PATENT APPLICATION  
FOR NATIONAL FILING UNDER 35 U.S.C. § 371  
(Page 2 of 2)

A filing fee is calculated based on the claims remaining in the application after entry of the preliminary amendment, if applicable,

Basic Fee under 1.492 (a) (5)						= \$ 860
Total Claims	5	minus	20 = *		X \$ 18	= \$
Independent	1	minus	3 = *		X \$ 80	= \$
Fee for Multiple dependent claims						\$ 270 = \$

Filing fee, Charge to Deposit Account 23-1950 \$ 860

**Authorization to Charge Deposit Account 23-1950:** The Commissioner is authorized to charge any fee or credit any overpayment to deposit account 23-1950 in conjunction with carrying out this or any other communication filed in the present invention.

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JC03 Rec'd PCT/PTO 16 APR 2001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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In the Matter of the Application of:

Mader et al.

Serial No.: Unknown (PCT/EP99/07278)

Date filed: Unknown (PCT Date: October 1, 1999)

For: SAFETY RELAY

Examiner: Unknown Group Art Unit: Unknown

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The Commissioner of Patents and Trademarks  
Washington, DC 20231

PRELIMINARY AMENDMENT

Concerning a Filing Under 35 U.S.C. § 371

Please AMEND the present Application as follows:

Please ADD the attached sheet labeled ABSTRACT.

In the SPECIFICATION:

With respect to the attached English translation of the International Application as published on April 27, 2000:

After the Title and before the text, please INSERT the following two (2) lines:

--BACKGROUND OF THE INVENTION--

--Field of the Invention--

On page 1, after the first paragraph (line 15) and before the second paragraph (line 16), please INSERT the following line:

--Summary of the Prior Art--

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On page 2, after the 1st paragraph (line 7) and before the 2nd paragraph (line 8), please INSERT the following line:

--SUMMARY OF THE INVENTION--

On page 3, after the 2nd paragraph (line 11) and before the third paragraph (line 12), please INSERT the following line:

--BRIEF DESCRIPTION OF THE DRAWINGS--

On page 3, beginning at line 12, please DELETE the following text:

"The invention will be described in more detail below with reference to an example embodiment, by way of the drawing, in which:"

On page 3, after line 28 and before line 29, please INSERT the following line:

--DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT--

On page 5, line 6, after "which", please insert --screen--.

On page 5, line 27, after "windows, please delete "46 and 47" and insert --47 and 48--.

In the Claims:

With respect now to claims 1-5 of the International Application as published on April 27, 2000 and the attached English translation thereof:

After the heading CLAIMS and before claim 1, please ADD the following line:

--We claim:--

Please DELETE claims 1-5.

Please INSERT the following new claims 6-10:

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--6. A relay comprising: a base that defines a base plane; a magnet system arranged on the base including a coil, a core and an armature; at least one pair of closing spring contacts and at least one pair of opening spring contacts, each pair of spring contacts including a passive and an active spring contact, and each spring contact being secured in the base, standing perpendicular to the base plane, and having at an end remote from the base a contact portion; and an actuating slide movable parallel to the base plane to act on each active spring contact, in the vicinity of the contact portion

characterised in that

the slide acts on the active spring contact of the pair of opening spring contacts at a different spacing from the spacing at the base and from that at which it acts on the corresponding closing spring contacts.--

--7. The relay according to Claim 6, wherein the slide acts on the active opening spring contacts in each case at a larger spacing as regards the point at which it is secured in the base from that at which it acts on the active closing spring contacts.--

--8. The relay according to Claim 7, wherein all the active spring contacts are of the same construction.--

--9. The relay according to Claim 6, wherein in the untensioned condition all the active spring contacts adopt an open position with respect to their associated passive spring contacts, and in that the active opening spring contacts are switched by the force of a restoring spring and the active closing spring contacts are switched by the force of the magnet system to their respective closing position.--

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--10. The relay according to Claim 6, wherein the magnet system has a U-shaped core with a core limb lying inside the coil and a yoke limb lying outside the coil, with the cross-section of iron within the core limb being increased by an additional flux member.

#### Remarks

An English translation of International Application PCT/EP99/07278 is filed herewith. Minor amendments to the literal translation were made to correct usage, phraseology matters and to comply with US practice. It is not believed any new substance has been added.

Amendments have been made to the Specification of the International Application PCT/EP99/07278 to comply with U.S. practice. An abstract is supplied herewith on a separate sheet.

The claims 1-5 contained in International Publication have been deleted. New claims 6-10 have been added that generally correspond to those of the publication, but with the reference numbers removed, multiple dependency removed, the dependency corrected in light of the new claim numbering and to present the subject matter of the claims in a form corresponding to US practice.

In view of the foregoing amendments and remarks, this application is now believed to be in condition for allowance; therefore, reconsideration and allowance are in order and hereby respectfully requested. If the Examiner believes it would be

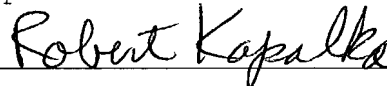
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helpful to discuss any aspect of this case, please contact Robert J. Kapalka (Registration No. 34198 of Tyco Technology Resources at telephone number (302) 633-2771.

Respectfully submitted,

Mader et al.

Applicant

A handwritten signature in cursive script, reading "Robert Kapalka", is written over a horizontal line.

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ABSTRACT

5 A relay having a base on which is arranged an  
electromagnetic system that actuates at least one pair of  
closing contact springs and at least one pair of opening  
contact springs where actuation is effected by a slide  
having actuation lugs located at different heights relative  
to the fixing of the active spring contacts for actuating  
10 the active opening spring contacts at a height different  
from that of the active closing spring contacts so that the  
characteristic curve of the magnetic system can be better  
adjusted to that of the spring contacts.





**PCT**  
WELTORGANISATION FÜR GEISTIGES EIGENTUM  
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INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES PATENTWESENS (PCT)

<p>(51) Internationale Patentklassifikation <sup>7</sup> : <b>H01H 50/64</b></p>	<p><b>A1</b></p>	<p>(11) Internationale Veröffentlichungsnummer: <b>WO 00/24019</b></p> <p>(43) Internationales Veröffentlichungsdatum: 27. April 2000 (27.04.00)</p>
<p>(21) Internationales Aktenzeichen: PCT/EP99/07278</p> <p>(22) Internationales Anmeldedatum: 1. Oktober 1999 (01.10.99)</p> <p>(30) Prioritätsdaten: 198 47 831.3      16. Oktober 1998 (16.10.98)      DE</p> <p>(71) Anmelder (für alle Bestimmungsstaaten ausser US): EH-SHRACK COMPONENTS AG [AT/AT]; Seybelgasse 13, A-1235 Wien (AT).</p> <p>(72) Erfinder; und (75) Erfinder/Anmelder (nur für US): MADER, Leopold [AT/AT]; Gumpoldskirchner Strasse 18-24, A-2340 Mödling (AT). MIKL, Rudolf [AT/AT]; Ganswiese 26, A-2464 Arbesthal (AT).</p> <p>(74) Gemeinsamer Vertreter: EH-SHRACK COMPONENTS AG; Seybelgasse 13, A-1235 Wien (AT).</p>		<p>(81) Bestimmungsstaaten: JP, US, europäisches Patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</p> <p><b>Veröffentlicht</b> <i>Mit internationalem Recherchenbericht.</i></p>

(54) Title: SECURITY RELAY

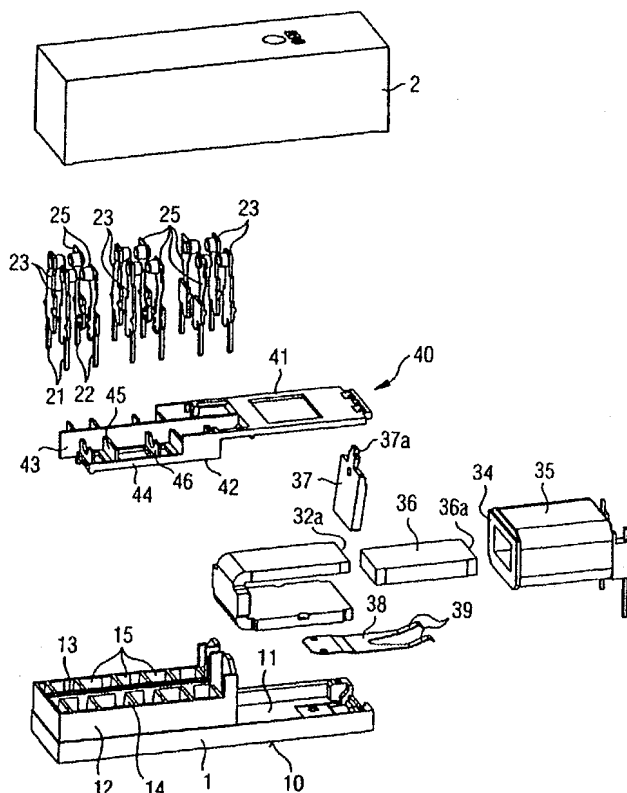
(54) Bezeichnung: SICHERHEITSRELAIS

(57) Abstract

The invention relates to a relay having a base body (1) over which an electromagnet system (31, 35, 37) is placed, said electromagnet system actuating at least one pair of closing relay springs (23A1, 23A2, 25A1, 25A2) and at least one pair of opening relay springs (23R, 25R). Actuation is carried out by means of a slide (40) which exhibits actuating cams (51, 52) located at different heights relatively to the mounting of the active relay springs (25) and designed for actuating the active opening relay springs at a height which is different from that of the active closing relay springs. Consequently, the characteristic curve of the magnetic system can be better adjusted to the characteristic curve of the relay springs.

(57) Zusammenfassung

Das Relais besitzt einen Grundkörper (1), auf dem ein Elektromagnetsystem (31, 35, 37) angeordnet ist und mindestens ein Schließer-Kontaktfederpaar (23A1, 23A2, 25A1, 25A2) sowie mindestens ein Öffner-Kontaktfederpaar (23R, 25R) betätigt. Zur Betätigung dient ein Schieber (40), der Betätigungsnasen (51, 52) in unterschiedlicher Höhe gegenüber der Einspannung der aktiven Kontaktfedern (25) aufweist, um die aktiven Öffner-Kontaktfedern in einer anderen Höhe zu betätigen als die aktiven Schließer-Kontaktfedern. Auf diese Weise kann die Kennlinie des Magnetsystems besser an die Federkennlinie der Kontaktfeder angepaßt werden.



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SAFETY RELAY

The invention relates to a relay, having: a base which defines a base plane; a magnet system arranged on the base and having a coil, a core and an armature; at least one pair of closing spring contacts and at least one pair of opening spring contacts, each pair of spring contacts including an active and a passive spring contact, and each spring contact being secured in the base, standing perpendicular to the base plane, and bearing at its end remote from the base a contact portion; and an actuating slide which is movable parallel to the base plane and which acts on each movable spring contact, in each case in the vicinity of the contact portion.

A relay of this type with forcibly guided contacts is known from DE 195 40 739 A1. There, the individual contact springs are arranged insulated from one another, with special structural measures also being taken to prevent short circuits in the event that contact portions become detached from the spring contacts. In this known relay, the active spring contacts, below the contact portions, are guided and actuated in laterally open slots in a slide. Laterally open actuating portions alter the stability of the slide, however, with the result that such slides already have a tendency to warp even during manufacture and do not retain optimum dimensional stability in operation either. A further problem with relay constructions of this kind consists in the fact that the force for opening the opening springs has to be overcome at the beginning of the movement of attraction of the armature, while the force for closing the closing contacts occurs towards the end of the armature movement of attraction. Since the force of an electromagnet system is small at the beginning of

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the armature movement of attraction, however, and only rises steeply towards the end of the movement of attraction, when the operational air gap is almost closed, application of the opening force is a problem  
5 which is typically solved by making the magnet system large in size, with this over-sizing not being necessary to close the closing contacts.

The object of the present invention is to construct a relay of the type mentioned at the outset such that  
10 the characteristic curve of the spring can be better adapted to that of the magnet system.

According to the invention, this object is achieved in that the slide acts on the active opening spring contacts at a different spacing as regards the way it is  
15 secured in the base from that at which it acts on the active closing spring contacts.

The formation of a slide, according to the invention, having different points of action on the opening spring contacts and the closing spring contacts  
20 as regards the way they are clamped in the base is achieved in that the opening contacts are opened with as small a force as possible and as long a distance as possible, while the closing contacts are closed with a short lever arm over a short distance. In this way, the  
25 force to be applied to open the opening contacts is therefore adapted to the force of the magnet system, smaller at the beginning of the movement of attraction, while the great magnetic force at the end of the movement of attraction of the armature is sufficient to  
30 actuate the closing contacts over a short distance, that is to say with a small lever arm. The result is an adaptation of the characteristic curve of the spring to that of the magnet system which is more precise overall, so that the magnet system itself is relatively small in  
35 size.

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In a preferred embodiment of the relay according to the invention, it may furthermore be provided that all the active spring contacts are of the same construction, so that neither the active opening spring contacts nor the active closing spring contacts are pre-tensioned in the direction of the associated passive spring contacts. The opening spring contacts are then actuated by an armature spring, while the closing spring contacts are actuated by the magnet system.

Further advantageous embodiments are specified in the subclaims.

The invention will be described in more detail below with reference to an example embodiment, by way of the drawing, in which:

Figure 1 shows a relay formed according to the invention, in an exploded illustration;

Figure 2 shows the relay from Figure 1 in the assembled condition, with the slide partially cut away and without a cover, in a perspective illustration;

Figure 3 shows the relay from Figure 2 in a rotated perspective illustration;

Figure 4 shows the relay from Figures 1 to 3 in side view, partially in longitudinal section;

Figures 5 and 6 show the slide of the relay from Figures 1 to 4 in two perspective views; and

Figure 7 shows a graph to illustrate the fundamental form of the force/distance characteristic curves of the magnet system and the springs of the relay.

The relay illustrated in Figures 1 to 6 has a base 1 made of insulating material, which is substantially flat in form and defines a base side 10, and with a cover 2 forms a closed housing. The base 1 has a flat, trough-shaped recess 11 for receiving a magnet system, while the remaining part, having raised side walls 12, a longitudinal intermediate wall 13 and transverse walls

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14, forms two rows of contact beam chambers 15. These contact beam chambers 15 narrow downwardly in the manner of slots to form plug-type channels 16 (see Figure 4), in order to receive fixed contact beams 21 or spring contact beams 22 which may be plugged in, in each case from above, perpendicularly to the base plane 10. The fixed contact beams 21 each form at their free ends passive (or fixed) spring contacts 23 with fixed contact portions 24 secured thereto, while active (or movable) spring contacts 25 with movable contact portions 26 secured to their free ends are in each case secured to the spring contact beams 22.

The magnet system serving to actuate the relay has a U-shaped core yoke 31 with a core limb 32 and a yoke limb 33. A coil body 34 bears an excitation coil 35 and receives the core limb 32 in an axial through opening. Since this core limb has a smaller width than the yoke limb 33, because of the limited width of the core, an additional flux guide part 36 is inserted into the interior of the coil, together with the core limb 32. In this way, the cross-section of iron within the coil is enlarged, as are the pole surfaces 32a and 36a, with which an armature 37 co-operates. This armature is mounted at the free end of the yoke limb 33 with the aid of an armature spring 38, and forms an operational air gap in a conventional manner with the pole surfaces 32a, 36a. Two restoring limbs 39 of the armature spring 38 provide the rest position for the contacts, in the non-excited condition of the magnet system.

Movement of the armature 37 is transmitted by way of an armature extension portion 37a to a slide 40 and by way of the latter to the active spring contacts 25. Since the spring contacts are arranged on the side of the magnet system opposite the armature, the slide has a connection portion 41 which extends above the coil and

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is adjoined by an actuating portion 42 which is set back in a stepped manner, downwardly in the direction of the base plane. This actuating portion forms, together with a central longitudinal wall 43 and side walls 44 and transverse walls 45 and 46 respectively, frames for each individual spring contact, which these spring contacts, with the exception of the respectively first passive spring contacts 24R and the respectively last passive spring contacts 23R and 23A2, which are in the end regions of the actuating portion 42 of the slide 40 and thus do not need any screening on one side with respect to an adjacent spring contact. By way of explanation, it should be noted here that the active and passive spring contacts 25 and 23 in Figure 4 are provided with additional designations to indicate the type of contact, in other words 23A1, 23A2 for passive operational spring contacts (closing spring contacts), 23R for passive rest spring contacts (opening spring contacts), 25A1 and 25A2 for active operational spring contacts (closing spring contacts) and 25R for active rest spring contacts (opening spring contacts). Within the frames of the slide 40, formed by partition walls 43, 44, 45 and 46, windows 47 are recessed for the active spring contacts and windows 48 are recessed for the passive spring contacts, respectively. The respective passive spring contacts 23 and active spring contacts 25 project through these windows 46 and 47 so that the ends bearing contact portions 24 and 26 respectively are each located above the actuating portion 42 of the slide and substantially within the frames formed by partition walls 43, 44, 45 and 46.

Those transverse walls or blocking walls 46, which each separate co-operating active and passive spring contacts, each have an approximately semi-circular recess 49 to match the round contour of the contact

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portions. A movable contact portion 26 of the active spring contacts 25 is guided respectively in this recess 49. This means that the active spring contact can itself bear snugly against the blocking wall 46 or a blocking rib 50 projecting from the blocking wall. Moreover, the slide forms actuating lugs 52 which project inwards in each case from the side walls 44 and actuate the active operational spring contacts or the active rest spring contacts respectively at different heights. The active spring contacts are in this case each arranged within the window 47 and are guided between the respective blocking rib 50 and the associated actuating lug 51 or 52 with a small amount of play. This means that if a contact welds, all the other active spring contacts are also blocked with respect to any further switching actuation.

When the relay is put together, first of all the assembled magnet system is inserted in the recess 11 in the base 1, with the armature spring 38 being secured between the yoke limb 33 and the base. The slide 40 is placed with its connection portion 41 on the magnet system, with the restoring limbs 39 of the armature spring 38 suspended in the apertures 41a in the slide. The armature itself is at the same time mounted on the yoke limb 33 and suspended by means of its extension portion 37a in the aperture 41b in the slide 40.

Once the slide 40, which is seated with its longitudinal partition wall 43 on the longitudinal wall 13 and with the longitudinal walls 44 on the side walls 12 of the base 1, has been mounted, the spring contacts are mounted. For this, all the spring contacts are inserted through the appropriate windows 47 and 48 in the slide, into the chambers 15 of the base, and secured in the plug-type slots 16. All the fixed contact beams 21 with the passive spring contacts 23 are of the same

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construction and straight, so that they can be inserted into the base perpendicularly with respect to the base plane. Moreover, all the active spring contacts 25 with their spring contact beams 22 are of the same construction and straight, so that they can be inserted through the associated windows 47 in the slide, perpendicularly with respect to the base plane, regardless of their function as operational spring contacts 25A1, 25A2 or rest spring contacts 25R. The slide 40 is for this purpose held in a central position in opposition to the pre-tension of the armature spring 38.

With this construction, all the spring contacts must be inserted into the base from above through the already mounted slide 40, because the end portions of the spring contacts, at least those of the active spring contacts 25 having the contact portions 26, have a larger cross-section than the windows 47, so that the slide cannot be pushed from above over the spring contacts afterwards. As a result of these relative sizes, on the one hand the slide is made stable because of the closed frames around the spring contacts, and on the other hand a broken-off contact portion cannot fall through a window 47 down into a spring chamber and there perhaps cause a short circuit.

In the non-excited condition of the magnet system, the slide is drawn into the rest position by the restoring force of the armature spring 38, that is to say to the right in Figure 4. During this, the rest spring contacts 25R, which are straight in the untensioned condition, are drawn to the right, into the position shown in Figure 4, so that they make contact with the passive spring contact 23R.

When the magnet system is excited, the slide is moved to the left in Figure 4, and the active rest



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spring contact 25R is raised away from the passive rest  
spring contact 23R and moved into its opened operational  
position by the blocking rib 50R. At the same time, the  
slide acts by means of the actuating lugs 51 laterally  
5 on the active operational spring contacts 25A1 and 25A2,  
and moves the latter in the direction of the passive  
operational spring contacts 23A1 and 23A2 until the  
corresponding operational contacts have been made. When  
the excitation is switched off, the armature spring 38  
10 restores the rest condition, with the slide 40 acting  
laterally by way of the actuating lugs 52 on the contact  
portions 26R and making the rest contacts. If one of the  
contacts welds, then the narrow guideway of the active  
spring contacts 25 ensures that further movement of the  
15 slide 40 and thus further actuation of the other  
contacts is blocked. If, for example, a rest contact  
welds, then the slide is blocked to prevent further  
movement, by way of the blocking rib 50R, which acts  
directly next to the contact portion. The operational  
20 contacts cannot therefore close. If, by contrast, an  
operational contact welds, then similarly by way of the  
blocking rib 50A acting on the associated spring contact  
next to the welded contact, the position of the slide is  
prevented from being restored and the rest contacts are  
25 prevented from being actuated.

Since, moreover, all the active spring contacts are  
constructed to be straight, they have the effect of  
opening by themselves. If for example an actuating lug  
51 or 52 on the slide breaks, then the active spring  
30 contact (opening contact) concerned opens, or is not  
closed (in the case of a closing contact). If by  
contrast the armature spring 38 breaks, then all the  
rest contacts (opening contacts) open and all the  
closing contacts are not closed again.

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As can be seen from the description and in particular from Figures 4, 5 and 6, the actuating lugs 52 for the active rest spring contacts 25R are substantially higher up with respect to the base plane than the actuating lugs 51 for the active operational spring contacts 25A1 and 25A2. As a result, the force/distance leverage is different for the operational contacts and the rest contacts. Since the magnet system is in each case strongest in the closed condition, that is to say when the armature is attracted or almost at the attracted position, while when the armature has fallen away the force increases only slowly as a result of the large air gap, normally the magnet system must be sized so as to ensure that the magnet system applies sufficient force even at the beginning of the armature movement of attraction, in order to actuate the rest contacts in the opening direction and hence to overcome the restoring force of the armature spring. As a result of the offset arrangement of the actuating points or the actuating lugs 51 and 52 with respect to the base plane, the effect is that the active opening spring contacts are actuated with less force and over a longer distance, while the active closing spring contacts are made to close over a short distance as a result of the shorter leverage. At this moment, the magnet system already has more force since the armature has already largely approached the pole surface. As a result of this measure, in particular with the construction of a safety relay in which no switch-over contacts are used, but rather separately actuatable opening and closing contacts, the efficiency of the magnet system can be increased, with the result that it can be of smaller size than is otherwise conventionally the case.

In the graph of Figure 7, the way the force/distance characteristic curves are adapted is shown. Here, f

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designates the characteristic curve of the totalled spring forces and  $m$  designates the characteristic curve of the magnet system. The forces  $F$  which act in each case in opposition to one another are applied over the distance  $s$ , which represents the movement of the armature and the movement of the slide 40 between the rest position (on the right in Figure 4, with the armature opened) and the operational position (on the left in Figure 4, with the armature closed). In the rest condition, the slide is for example at the point  $s_1$  or to the right of it, depending on the contact erosion. When the armature is attracted, the slide moves to the left, with the force  $m$  of the magnet system first rising only slowly. In this range, as far as  $s_2$ , however, the opening force to be overcome (at the active rest spring contact or the armature spring adapted thereto) is also still relatively small because of the large leverage. From  $s_2$  to  $s_3$ , the active operational spring contacts produce a more steeply rising spring force which is overcome by a magnetic force  $m$ , which also rises more steeply in this range. From  $s_3$  to the point of abutment, both the spring force  $f$  and the magnetic force rise steeply. This is the range of the overtravel to the point  $s_4$ .

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CLAIMS

1. A relay, having: a base (1) which defines a base plane (10); a magnet system arranged on the base (1) and having a coil (35), a core (31) and an armature (37); at least one pair of closing spring contacts (23A', 25A', 23A2, 25A2) and at least one pair of opening spring contacts (23R, 25R), each pair of spring contacts including a passive (23) and an active (25) spring contact, and each spring contact (23, 25) being secured in the base (1), standing perpendicular to the base plane, and bearing at its end remote from the base a contact portion (24, 26); and an actuating slide (40) which is movable parallel to the base plane (10) and which acts on each active spring contact (25), in each case in the vicinity of the contact portion (26),

characterised in that

the slide (40) acts on the active opening spring contacts (25R) at a different spacing as regards the way it is secured in the base (1) from that at which it acts on the active closing spring contacts (25A1, 25A2).

2. A relay according to Claim 1, characterised in that the slide (40) acts on the active opening spring contacts (25R) in each case at a larger spacing as regards the point at which it is secured in the base (1) from that at which it acts on the active closing spring contacts (25A1, 25A2).

3. A relay according to Claim 1 or 2, characterised in that all the active spring contacts (25) are of the same construction.

4. A relay according to one of Claims 1 to 3, characterised in that in the untensioned condition all

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the active spring contacts (25) adopt an open position with respect to their associated passive spring contacts (23), and in that the active opening spring contacts (25R) are switched by the force of a restoring spring (38) and the active closing spring contacts (25A1, 25A2) are switched by the force of the magnet system (35, 31, 37) to their respective closing position.

5. A relay according to one of Claims 1 to 4, characterised in that the magnet system (31, 35, 37) has a U-shaped core (31) with a core limb (32) lying inside the coil and a yoke limb (33) lying outside the coil, with the cross-section of iron within the core limb (32) being increased by an additional flux member (36).

# Declaration and Power of Attorney for Patent Application

## Erklärung für Patentanmeldungen mit Vollmacht

### German Language Declaration



Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

Dass mein Wohnsitz, meine Postanschrift und meine Staatsangehörigkeit den im nachstehenden nach meinem Namen aufgeführten Angaben entsprechen;

dass ich nach bestem Wissen der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder (falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin, für den dieser Antrag gestellt wird und für den ein Patent beantragt wird für die Erfindung mit dem Titel:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

deren Beschreibung

(Zutreffendes ankreuzen)

☐

hier beigefügt ist.

☐

am \_\_\_\_\_ unter der

Anmeldungsseriennummer \_\_\_\_\_

eingereicht wurde und am \_\_\_\_\_  
abgeändert wurde (falls tatsächlich abgeändert).

Ich bestätige hiermit, dass ich den Inhalt der obigen Patentanmeldung, einschliesslich der Ansprüche, durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag, wie oben erwähnt, abgeändert wurde.

Ich erkenne meine Pflicht zur Offenbarung irgendwelcher Informationen, die für die Prüfung der vorliegenden Anmeldung in Einklang mit Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) von Wichtigkeit sind, an.

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäss Abschnitt 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 119 aller unten angegebenen Auslandsanmeldungen für ein Patent oder eine Erfinderurkunde, und habe auch alle Auslandsanmeldungen für ein Patent oder eine Erfinderurkunde nachstehend gekennzeichnet, die ein Anmeldedatum haben, das vor dem Anmeldedatum der Anmeldung liegt, für die Priorität beansprucht wird.

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

#### SAFETY RELAY

\_\_\_\_\_

\_\_\_\_\_

the specification of which

(check one)

☐

is attached hereto.

☒

was filed on Oct. 1, 1999 (PCT filing date) as

Application Serial No. 09/807,689

May 16, 2000 and

and was amended on April 16, 2001  
(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:



# German Language Declaration

Prior foreign applications  
Priorität beansprucht

Priority Claimed

198 47 831.3

DE

16/10/98

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☐

(Number)  
(Nummer)

(Country)  
(Land)

Day/Month/Year Filed  
Tag/Monat/Jahr eingereicht

Yes  
Ja

No  
Nein

(Number)  
(Nummer)

(Country)  
(Land)

Day/Month/Year Filed  
Tag/Monat/Jahr eingereicht

☐  
Yes  
Ja

☐  
No  
Nein

(Number)  
(Nummer)

(Country)  
(Land)

Day/Month/Year Filed  
Tag/Monat/Jahr eingereicht

☐  
Yes  
Ja

☐  
No  
Nein

Ich beanspruche hiermit gemäss Absatz 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmeldungen, und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer früheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 112, offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der früheren Anmeldung und dem nationalen oder PCT internationalen Anmeldedatum dieser Anmeldung bekannt geworden sind.

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

PCT/EP99/07278

(Application Serial No.)  
(Anmeldeseriennummer)

01/10/99

(Filing Date)  
(Anmeldedatum)

pending

(Status)  
(patentiert, anhangig,  
aufgegeben)

(Status)  
(patented, pending,  
abandoned)

(Application Serial No.)  
(Anmeldeseriennummer)

(Filing Date)  
(Anmeldedatum)

(Status)  
(patentiert, anhangig,  
aufgegeben)

(Status)  
(patented, pending,  
abandoned)

Ich erkläre hiermit, dass alle von mir in der vorliegenden Erklärung gemachten Angaben nach meinem besten Wissen und Gewissen der vollen Wahrheit entsprechen, und dass ich diese eidesstattliche Erklärung in Kenntnis dessen abgebe, dass wissentlich und vorsätzlich falsche Angaben gemäss Paragraph 1001, Absatz 18 der Zivilprozessordnung der Vereinigten Staaten von Amerika mit Geldstrafe belegt und/oder Gefängnis bestraft werden können, und dass derartig wissentlich und vorsätzlich falsche Angaben die Gültigkeit der vorliegenden Patentanmeldung oder eines darauf erteilten Patentes gefährden können.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

## German Language Declaration

**VERTRETUNGSVOLLMACHT:** Als benannter Erfinder beauftrage ich hiermit den nachstehend benannten Patentanwalt (oder die nachstehend benannten Patentanwälte) und/oder Patent-Agenten mit der Verfolgung der vorliegenden Patentanmeldung sowie mit der Abwicklung aller damit verbundenen Geschäfte vor dem Patent- und Warenzeichenamt: (*Name und Registrationsnummer anführen*)

**POWER OF ATTORNEY:** As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (*list name and registration number*)

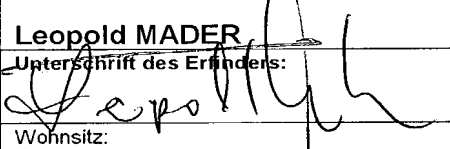
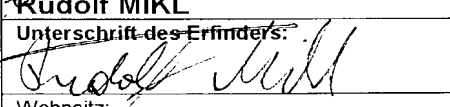
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100 Voller Name des einzigen oder ursprünglichen Erfinders: <b>Leopold MADER</b> Unterschrift des Erfinders:  Datum: <b>23 May 2001</b> Wohnsitz: <b>Gumpoldkirchnerstr. 18/3/18, 2340 Moedling</b> Staatsangehörigkeit: <b>Austrian</b> <i>Aut</i> Postanschrift: <b>Gumpoldkirchnerstr. 18/3/18, 2340 Moedling</b> <b>Austria</b>	Full name of sole or first inventor:  Inventor's signature: _____ Date: _____ Residence:  Citizenship:  Post Office Address:  
200 Voller Name des zweiten Miterfinders, falls zutreffend: <b>Rudolf MIKL</b> Unterschrift des Erfinders:  Datum: <b>23 May 2001</b> Wohnsitz: <b>Ganswiese 26, 2464 Arbesthal</b> Staatsangehörigkeit: <b>Austrian</b> <i>Aut</i> Postanschrift: <b>Ganswiese 26, 2464 Arbesthal, Austria</b>	Full name of second joint inventor, if any:  Inventor's signature: _____ Date: _____ Residence:  Citizenship:  Post Office Address:  

(Bitte entsprechende Informationen und Unterschriften im Falle von dritten und weiteren Miterfindern angeben).

(Supply similar information and signature for third and subsequent joint inventors.)